Section-B JEE Main-Quadratic Equations

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1) The number of real solutions of the equation $x^2 - 3|x| + 2 = 0$ is
   a) 3
   b) 2
   c) 4
   d) 1
2) The real number x when added to its inverse gives the minimum value of the sum at x equal to [2003]
   a) -2
   b) 2
   c) 1
   d) -1
3) Let two numbers have arithmetic mean 9 and geometric mean 4. Then these numbers are the roots of the quadratic equation [2004]
   a) $x^2 - 18x - 16 = 0$
   b) $x^2 - 18x + 16 = 0$
   c) $x^2 + 18x - 16 = 0$
   d) $x^2 + 18x + 16 = 0$
4) If $(1 - p)$ is a root of quadratic equation $x^2 + px + (1 - p) = 0$ then its root are [2004]
   a) $-1, 2$
   b) $-1, 1$
   c) $0, -1$
   d) $0, 1$
5) If one root of the equation $x^2 + px + 12 = 0$ is 4, while the equation $x^2 + px + q = 0$ has equal roots , then the value of 'q' is [2004]
   a) 4
   b) 12
   c) 3
   d) $\frac{49}{4}$
6) In a triangle PQR, $\angle R = \frac{\pi}{2}$. If $\tan\left(\frac{P}{2}\right)$ and $-\tan\left(\frac{Q}{2}\right)$ are the roots of $ax^2+bx+c = 0$, $a \neq 0$ then [2005]
   a) $a = b + c$
   b) $c = a + b$
   c) $b = c$
   d) $b = a + c$
7) If both the roots of the quadratic equation $x^2 - 2kx + k^2 + k - 5 = 0$ are less than 5, then k lies in the interval [2005]
   a) $(5, 6]$
   b) $(6, \infty)$
   c) $(-\infty, 4)$
   d) $[4, 5]$
8) If the roots of the quadratic equation $x^2 + px + q = 0$ are $\tan 30°$ and $\tan 15°$, respectively, then the value of $2 + q - p$ is [2006]
   a) 2
   b) 3
   c) 0
   d) 1
9) All the values of m for which both roots of the equation $x^2 - 2mx + m^2 - 1 = 0$ are greater than -2 but less than 4, lie in the interval [2006]
   a) $-2 < m < 0$
   b) $m > 3$
   c) $-1 < m < 3$
   d) $1 < m < 4$
10) If x is real, the maximum value of $\frac{3x^2+9x+17}{3x^2+9x+7}$ is [2006]
    a) $\frac{1}{4}$
    b) 41
    c) 1
    d) $\frac{17}{7}$
11) If the difference between the roots of the equation $x^2 + ax + 1 = 0$ is less than $\sqrt{5}$, then the set of possible values of a is [2007]
    a) $(3, \infty)$
    b) $(-\infty, -3)$
    c) $(-3, 3)$
    d) $(-3, \infty)$
12) **Statement-1 :** For every natural number $n \geq 2$,

$$\frac{1}{\sqrt{1}} + \frac{1}{\sqrt{2}} + ... + \frac{1}{\sqrt{n}} > \sqrt{n}$$

Statement-2 : For every natural number $n \geq 2$,

$$\sqrt{n(n+1)} < n + 1$$

[2008]

a) Statement-1 is false, Statement-2 is true
b) Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for Statement-1
c) Statement-1 is true, Statement-2 is true, Statement-2 is not a correct explanation for Statement-1
d) Statement-1 is true, Statement-2 is false

13) The quadratic equations $x^2 - 6x + a = 0$ and $x^2 - cx + 6 = 0$ have one root in common. The roots of the first and second equations are integers in the ratio 4 : 3. Then the common root is [2009]
a) 1
b) 4
c) 3
d) 2

14) If the roots of the equation $bx^2 + cx + a = 0$ be imaginary, then for all the real values of x, the expression
$3b^2x^2 + 6bcx + 2c^2$ is : [2009]
a) less than $4ab$
b) greater than $-4ab$
c) less than $-4ab$
d) greater than $4ab$

15) If $\left|z - \frac{4}{z}\right| = 2$, then the maximum value of $|Z|$ is equal to : [2009]
a) $\sqrt{5} + 1$
b) 2
c) $2 + \sqrt{2}$
d) $\sqrt{3} + 1$

16) If α and β are the roots of the equation $x^2 - x + 1 = 0$, then $\alpha^{2009} + \beta^{2009} =$ [2010]
a) -1
b) 1
c) 2
d) -2